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ABSTRACT

This study investigated the relation between field independence/field dependence (FI/FD) and reading success. One hundred kindergarten children from a predominantly white, middle-class community were administered a Portable Rod and Frame Test as a measure of cognitive style. The upper and lower 27% were identified and designated Field Dependent and Field Independent. The Slosson Oral Reading Test was administered as an indicator of reading achievement and the Slosson Intelligence Test as a measure of intellectual maturity. It was hypothesized that significantly more FI children would be early readers than FD children and FI children would achieve significantly higher scores on the SORT than FD children. Results from a chi-square and t-test analysis did not support the two hypotheses. Further research is needed on the synergistic effect of other cognitive style dimensions. (Author)

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FIELD INDEPENDENCE/FIELD DEPENDENCE AND

PRECOCIOUS KINDERGARTEN READERS

A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS

THE STATE UNIVERSITY OF NEW JERSEY

BY

DIANE K. COX

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

NEW BRUNSWICK, NEW JERSEY

JUNE, 1976

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COMMITTEE CHAIRPERSON: MARTIN KLING, PH.D.

NEW BRUNSWICK, NEW JERSEY

JUNE, 1976

ABSTRACT

This study investigated the relation between Field Independence/Field Dependence (FI/FD) and reading success.

One hundred kindergarten children from a predominantly white, middle-class community were administered a Portable Rod and Frame Test as a measure of cognitive style. The upper and lower 27% were identified and designated Field Dependent and Field Independent. The Slosson Oral Reading Test (SORT) was administered as an indicator of reading achievement and the Slosson Intelligence Test (SIT) as a measure of intellectual maturity.

It was hypothesized that (a) significantly more FI children would be early readers than FD children and (b) FI children would achieve significantly higher scores on the SORT than FD children.

Results from a chi-square and t-test analysis did not support the two hypotheses.

Further research is needed on the synergistic effect of other cognitive style dimensions.

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CHAPTER I

THE PROBLEM

Background of the Problem

Over the past 20 years, much research has been done in the area termed "cognitive style." As Coop (1971) stated, "The lack of commonality in definition of the label 'cognitive style' has caused this term to become investigator specific" (p. 152). Cognitive style could refer to one of several dimensions such as leveling-sharpening, constricted-flexible, reflective-impulsive, internalizer-externalizer, tolerance-intolerance for unrealistic experience, or field dependent-field independent.

This study focused on the dimension of cognitive style as defined by Witkin, Dyk, Faterson, Goodenough, and Karp (1962) as Field Independency, Field Dependency. This mode of functioning involves an individual's approach to a variety of perceptual and intellectual situations.

The issue involved is "the extent to which the surrounding visual framework dominates perception of an item within it" (Witkin, 1973, p. 4). A Field Independent person is able to separate an item from its surrounding visual background. The perception of a Field Dependent individual is dominated by the surrounding visual field. "There is

relative inability to perceive parts of a field as discrete" (Witkin, 1967, p. 291). This is not to imply that there are two distinct types of people but rather the existence of a continuous dimension. Thus, a person is relatively Field Independent or Field Dependent as compared to the mean or to another person.

These constructs are measured by a variety of instruments. One of the most widely used is a rod and frame apparatus consisting of a movable rod inside a movable frame. The subject is asked to indicate when he feels the rod is perpendicular to the floor. A Field Dependent individual is influenced by the position of the frame to determine when the rod is upright. If the frame is tilted to the right, the subject may report the rod to be upright when it is also tilted to the right. A Field Independent person will be able to bring the rod to upright independent of the position of the frame. Thus, the higher the score on a rod and frame test, the more Field Dependent the person.

The research has shown people to be amazingly stable in their characteristic mode of perceiving (Witkin, 1972; Witkin, Goodenough & Karp, 1967). Children as young as kindergarten and first grade have been shown to be relatively stable in this dimension (Dreyer, 1969, 1971). Children from ages 6 to 24 become progressively more Field Independent with age but remain in the same relative

positions within their groups (Dreyer, 1971).

Field Independency/Dependency has been related to a variety of behavioral situations. These include choice of college major and careers, speech patterns, dress, social functioning, and teaching methods (Witkin, 1973). Lately, much research has been conducted in the area of cognitive style and reading ability. The results show a positive relationship between Field Independence and reading achievement (Bruininks, 1969; Gill, 1969; Gluck, 1972; Peterson, 1969; Stuart, 1969; Watson, 1969; Wineman, 1971). However, most of the studies deal with intermediate to upper elementary and high school children with few considering children below the first grade.

The thrust of the present study concerned Field Independence/Dependence and early reading ability in kindergarten children. Extensive work in the area of early reading has been undertaken by Durkin (1966). She performed two longitudinal studies concerning precocious first grade readers in California (1958-1964) and New York (1961-1964).

Early readers in the California study were most often described by parents as "persistent" and "perfectionistic" and least often as "affectionate," "dependent," "needs to be praised," or "eager to please adults" (Durkin, 1966). These characteristics correspond directly to personality correlates of cognitive style, the former most often associated with Field Independence and the latter Field

Dependence.

The New York study compared characteristics of early readers to non-early readers and found no significant differences between personality descriptors of these two types of children. The only differences found were in family background characteristics.

Statement of the Problem

The purpose of this study was to answer the following question: What is the relationship between Field Independence/Field Dependence and reading success in precocious kindergarten readers?

Durkin asks why more children living in a world surrounded by so many words, numbers, and letters in all types of media do not learn to read before receiving formal instruction. It was postulated that early reading ability is dependent on this dimension of cognitive style. It was hypothesized that:

1. Significantly more Field Independent children would be early readers than Field Dependent children.
2. Field Independent children would achieve significantly higher scores on the Slosson Oral Reading Test than Field Dependent children.

Importance of the Problem

Theoretical Significance

If the hypotheses are substantiated, further support would be generated for the relationship between Field Independency and reading success.

Clinical Significance

Possible diagnosis of potential reading problems could be initiated at the kindergarten level.

Educational Significance

Since 1930, educators have endeavored to discover a means by which reading success or failure could be predicted. Thus, reading readiness tests were developed. Present reading readiness measures are not very effective predictors of reading achievement with average correlation coefficients of .50 to .60, accounting for only 25-36% of the variance (Spache, 1969). In a longitudinal study by de Hirsch (1957), tests of visual and auditory perception were among the most useful measures for predicting later reading disability.

If the hypotheses are supported, for some children analysis of cognitive style may serve as a more effective predictor of reading success in first grade than present reading readiness tests. Assessment of cognitive style may also enable more effective planning of kindergarten and first grade programs for these children.

Definition of Terms

Cognitive Style

Cognitive style referred to the dimension of Field Independence/Field Dependence (FI/FD) as defined by Witkin et al. (1962). FI/FD was assessed by scores on a Portable Rod and Frame Apparatus (PRFA, Model PR-20, Research Media, Inc.). The sum of the deviations, regardless of direction, from the vertical determined the score on the PRFA.

Precocious Readers

Precocious readers were identified as those entering kindergarten children who achieved a grade equivalent score of .1 or greater on the Slosson Oral Reading Test (SORT, Slosson, 1963b) and who had not received any school instruction in reading.

Limitations of the Study

The sample was drawn from a predominately white, middle-class area. Therefore, the generalizability of results from this study is limited to children of the same socioeconomic class. Experimenter error was introduced by the use of community volunteers in administering the PRFA and SORT. However, the extensive administration time required per subject and the professional responsibilities of the researcher necessitated these conditions.

The study is also limited by an arbitrary definition of precocious readers as those children entering kindergarten with the ability to read.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

One explanation of learning to read involves a perceptual viewpoint in which reading is the process of separating meaningful cues from their surrounding field and imposing perceptual structure upon the printed page. "In order to cope with printed language the child must be able to pick out the figure from the background" (de Hirsch, 1957, p. 31). Mussen, Conger, and Kagan (1963) suggested that success in reading depends on analytic or abstract orientation. The child must be able to perceive phonemes as distinct from their surroundings so as to associate a sound with each phoneme and blend these sounds into a unit. Only then can the child derive meaning from the printed page. Bruininks (1969) stated that poor readers have repeatedly been found to be inferior to good readers on measures of auditory and visual perception.

Witkin described FI children as having this capacity to impose structure upon a field which lacks it. He made the observation that "children with learning difficulties especially in the area of reading, tend to be Field Dependent" (Witkin, 1973, p. 31).

From these comments, it could be assumed that FI children would experience greater success in reading tasks than FD children. Several studies support this hypothesis. They are discussed in two sections, primary (grades kindergarten to 3) and intermediate-high school (grades 4 to 12). The discussion then turns to a consideration of the precocious kindergarten reader.

Cognitive Style and Reading Achievement,
Primary (K-3)

Watson (1969) investigated the relationship between scores on the Children's Embedded Figures Test (CEFT, Karp & Konstadt, 1963), Harris Draw A Person Test (DAPT, a measure of intelligence), and the reading section of the Stanford Achievement Test. The sample consisted of boys grades one to three ($n = 75$) from a white, middle-class area. Results indicated strong support for the relationship between FI and reading achievement. The CEFT was significantly related to reading achievement in 11/13 subtests. More specifically, correlations reached the .01 significance level for grade one on the Word Reading ($r = .54$), Paragraph Meaning ($r = .57$), Total Reading ($r = .64$), Word Study Skills ($r = .64$), and Vocabulary ($r = .66$) subtests. For grade two, correlations reached the .01 significance level for the Word Meaning ($r = .53$), and Total Reading ($r = .53$) subtests and the .05 level for the Paragraph Meaning subtest ($r = .49$). Correlations of the .05

significance level were reached on the following subtests for grade three: Paragraph Meaning ($r = .42$), Total Reading ($r = .41$), and Word Study Skills ($r = .41$). Considered as a total group grades one to three, significant correlations ranging from .54 to .66 ($p < .01$) were achieved for all subtests.

Gluck (1972) conducted a study using 54 male and female first grade children of white, middle-class socioeconomic status. Both the Portable Rod and Frame Test (PRFT) and the CEFT were used to assess cognitive style. The Stanford Reading Test was employed as a measure of reading ability. Gluck found only the CEFT to be significantly related to reading achievement ($r = .56$ Stanford Reading Test, $r = .58$ all achievement tests, $p < .01$). Results from the PRFT were not significant but were in the expected direction. Gluck utilized questionable methodology in administering the PRFT which limits validity of the results.

Gill (1968) used a modified version of the Rod and Frame, developed by Gill, to assess the relationship between cognitive style and reading achievement as indicated by scores on the Metropolitan Achievement Test. The sample consisted of 116 children in first grade, 56 males and 60 females. Results show the modified Rod and Frame to be a moderate predictor of reading achievement for males only (correlations males = .45, $p < .01$, females = .25, $p < .05$).

However, the use of a modified instrument also limits the generalizability of Gill's results.

Bruininks (1969) tested 105 disadvantaged males to determine the relationship between a battery of perceptual measures and reading achievement. The CEFT was one measure included in the study. Bruininks found a correlation of .367 ($p < .05$) between scores on the CEFT and reading achievement.

Cognitive Style and Reading Achievement,
Intermediate-High School (4-12)

Wineman (1971) employed 270 children of fourth, fifth, and sixth grades to test the relationship between the two variables. The measure of cognitive style was Harris Draw A Person Test scored according to Witkin's specifications. The California Reading Test (Elementary) was administered to the fourth and fifth grade children and the California Achievement Test (Elementary) to the sixth grade subjects. The findings showed a correlation of .39 for males and .36 for females ($p < .05$) for fourth grade, no significance for the fifth grade subjects, and a correlation of .56 ($p < .01$) for the Reading Vocabulary subtest and .54 ($p < .01$) for the Reading Comprehension subtest for sixth grade females. The results for sixth grade males did not reach significance. Wineman attributed the lack of significance in fifth grade results to the impact of adolescence upon the children. Thus, Wineman found a strong

relationship between cognitive style and reading achievement for sixth grade females.

Stuart (1967) used the Embedded Figures Test (EFT) as a measure of cognitive style and Reading Grade Level as an indicator of reading achievement. When scores of good and poor readers were treated as one group, a correlation of .52 ($p < .01$) was achieved (males .59, females .45). Results dichotomized into "good" and "poor" readers according to the school's instructional system, did not reach significance ($r = .47$ and $.36$, respectively).

Peterson (1969) found a correlation of .60 ($p < .01$) between cognitive style as indicated by the EFT and reading achievement utilizing the reading section of the Wide Range Achievement Test. The sample consisted of 20 subjects from 16 to 20 years of age (18 males, 2 females).

Cohn (1968) also found a positive relationship between comprehension (Sangren-Woody Reading Test) and cognitive style (EFT). The sample consisted of 123 sixth grade children.

Early Readers

Dolores Durkin has been the authority in the area of precocious readers. She conducted two longitudinal studies to identify factors connected with early reading success. The first experiment began in California in September 1958 and the second in New York City in September 1961. Both were concluded in June 1964. The methodology of both

projects was virtually identical. The New York undertaking was designed to improve several facets of the California study. The major changes consisted of improvements in format of the questionnaire administered to parents and the addition of a non-early reading group permitting a comparative study.

Durkin tested a large number of first grade children in each project (California $n = 5,103$; New York $n = 4,465$). Each child was asked to read a list of 37 words taken from three common basals. If the child could correctly identify 18 out of 37 words, he was given part of the Gates Reading Test. Any child not achieving a grade equivalent score of 1.0 was eliminated from the sample. The Stanford-Binet Intelligence Test was also administered. In the New York study, 30 early readers were then selected from the sample and matched on the basis of intelligence with 30 non-early readers. These two groups were used for all subsequent analyses. Durkin found less than 1% of the total population to qualify as precocious readers in California ($n = 49$, 20 males, 29 females), and 3.3% in New York ($n = 156$, 76 males, 80 females). All testing was accomplished during the first two weeks of school.

Durkin summarized the process by which precocious readers learned to read. All started by exhibiting curiosity about the written word and then became interested in scribbling and drawing. This evolved into copying objects

and letters and then the child's own name. She also found parental re-reading of the same stories was more beneficial than reading only once as the child was able to memorize certain word configurations.

In both studies, intelligence was not found to be an important factor in early reading success. The correlation between reading achievement and intelligence for grade one was .40 in the California experiment and .24 in New York ($p < .01$), accounting for only 4-16% of the variance. Durkin found no clear-cut relationship between early reading and socioeconomic status.

Results indicated several personality characteristics were associated with early readers in the California experiment. Descriptors most often applied to precocious readers were "persistent" and "perfectionistic." Least often associated were "needs to be praised," "affectionate," "dependent," and "eager to please adults" (Durkin, 1966, p. 50). These findings led Durkin to conclude that personality factors play an important part in the process of learning to read and that "researchers concerned with children who succeed in learning to read have almost completely overlooked personality structure as a contributing factor" (Durkin, 1961, p. 165).

The New York study did not support these findings. Early readers and non-early readers did not differ significantly with respect to personality characteristics as

reported by parents. The results did indicate that early readers showed more preschool interest in learning to read, walked and talked at an earlier age, and participated in more quiet games (puzzles, drawing, coloring, printing, looking at pictures and books) than non-early readers. The latter were more involved in active play and more interested in toys than in books, blackboards, or pencil and paper. These results characterize the precocious reader as more independent and less socially oriented than his non-early reading counterpart.

Summary

A strong relationship between the two variables of reading achievement and cognitive style is indicated by the review of the literature, both primary and intermediate-high school. More specifically, FI and reading achievement are positively related. Children who are FI experience a greater degree of success in reading than FD subjects.

Durkin's studies indicate early reading ability does not depend on intelligence or socioeconomic status but on personality characteristics and preschool experiences. These factors common to precocious readers are also associated with FI. Thus, it is hypothesized more FI children will be early readers; and these children will experience greater reading achievement than FD subjects.

CHAPTER III

METHOD

Sample

The East Windsor Regional School District is located in Central New Jersey and draws its student population from a predominately white, middle-class community. The district operates on a multi-unit system. All children employed in this study were enrolled in one K-2 unit of the district. The sample consisted of a pool of 100 male and female kindergarten children. Fifty-four boys and girls were then selected as to FI/FD. Children with learning problems such as blindness, deafness, and cerebral palsy were eliminated from the study.

Design

Field Independence/Dependence was assessed by the Portable Rod and Frame Apparatus (PRFA, Model PR-20, Research Media, Inc., 1966). This instrument is a compact, table-top model of the original Rod and Frame Apparatus developed by Witkin to assess FI/FD. Model PR-20 consists of a 15 x 15 x 6 inch unit containing an ultraviolet lamp (115 volts) and two movable plates.

The frame and tilting rod are located on the movable plates and operated by manipulating a control knob. The

rod and frame can be tilted independently or simultaneously 20° right or left. A protractor and level are accessible from the rear of the apparatus for accurate reading of deviations from the upright. The instrument was operated in a totally darkened room. This particular model was modified to include a light intensity control switch allowing the experimenter to adjust the ultraviolet light.

The manual did not include any test-retest reliability data. Correlational results from a comparison of the PR-20 with Oltman's Portable Rod and Frame Test were also not available.

The Slosson Oral Reading Test (SORT, Slosson, 1963b) was employed as a measure of reading achievement. The SORT consists of a series of nine word lists from primer to high school level. Each list is composed of 20 words based on the vocabulary of several current reading series. The test yields a reading level score in terms of a grade equivalent. The manual reports a test-retest reliability coefficient of .99 after a one week interval. A correlation of .96 was obtained with the Gray Oral Reading Test using 108 children from first grade to high school.

The Slosson Intelligence Test (SIT, Slosson, 1963a) was included as a measure of intellectual maturity. The SIT is an individual screening device requiring 10 to 20 minutes for administration and scoring. The scoring procedure produces a mental age (MA) which when divided by the

chronological age (CA) and multiplied by 100 yields an intelligence quotient. The test items are patterned after those of the Stanford-Binet Intelligence Test, Form L-M.

Slosson cites a test-retest reliability coefficient after a two month interval of .97 using 139 subjects ranging from 4 to 50 years of age. The manual includes a standard error of measurement of 4.3. Slosson also indicates correlation coefficients ranging from .90 to .98 (ages 4 to 7) with the Stanford Binet, Form L-M.

Procedure

All tests were administered during the first three weeks of the 1975-1976 school year during school time. This was to insure accurate identification of precocious readers as those children who learned to read prior to any formal school instruction. The tests were administered in the following order: PRFA, SORT, SIT.

Instructions for administering the PRFA were those employed by Dreyer (1971) in the reliability study employing kindergarten subjects and using Oltman's rod and frame model. These directions constituted a change from procedures suggested by Oltman.

The PRFA was administered individually to each subject by a trained community volunteer. A model of the apparatus was provided for demonstration. Testing was conducted in a darkened room with no windows. There was a considerable amount of ambient illumination from the

ultraviolet lamp. This condition necessitated the removal of objects from the near proximity of the subject and experimenter and covering others with black paper. To prevent illumination of the table, the PRFA was placed at the extreme edge.

A curtain was attached to the front of the PRFA to prevent the subject from viewing the position of the rod and frame before each trial. The curtain was added to comply more specifically with the design of Oltman's table-top model ($r = .89$ with Witkin's original instrument, Oltman, 1958). When the curtain was opened, the rod was turned in 3° increments until the subject reported it to be upright.

Ten trials were given with initial rod and frame tilts of 20° right (R) and left (L) in this sequence:

rod: RLLRRLRRL

frame: LLRRLRRL

For example, in trial 1 the rod was initially tilted 20° to the right and the frame, 20° to the left. Trial 2 began with both the rod and frame tilted 20° to the left. The number of trials was increased from 8, as specified by Oltman, to 10--the last two duplicating the first two. Dreyer found that some subjects understood the task only after performing the first two trials. Time for administration per child was approximately 10 to 15 minutes.

The score for each subject was the sum of the deviations in degree per 8 trials from true vertical, regardless

of direction. The upper and lower 27% were then identified forming two extreme groups, one FI, the other FD. These two groups formed the basis for all further analyses.

Test directions for the SORT followed those indicated in the test manual. The child was asked to read as many words from each list as he was capable of doing. He read until he could not pronounce any of the 20 words on one list. Mispronounced or omitted words as well as words requiring more than five seconds to pronounce were considered errors. The raw score, total number of correct words, was converted into a grade equivalent reading level by use of a chart in the manual.

For the purpose of this study, any subject receiving a reading score of .1 on the SORT was considered a precocious kindergarten reader. The SORT was administered individually by the researcher and trained volunteers. Time of administration per subject was approximately three minutes.

The SIT was administered as described in the manual. After establishing a basal age, questioning continued until the child missed 10 in succession. Credit was allocated in differing amounts for each question answered correctly above the basal age. The basal age and additional credit in months produced the subject's MA. A ratio IQ was then obtained by dividing $MA/CA \times 100$.

The SIT was individually administered by the

experimenter and a trained volunteer. All tabulations were performed by the researcher. Time for administration and scoring was approximately 15 minutes per subject.

Summary

From a pool of 100 male and female kindergarten children, a sample of 54 boys and girls were selected as to FI/FD. These children were drawn from a white, middle-class, socioeconomic background. The PRFA was administered as an index of cognitive style, the SORT as an indicator of early reading achievement, and the SIT as a measure of intellectual maturity. All testing was completed within the first three weeks of the 1975-1976 school year by the researcher and two trained community volunteers.

CHAPTER IV

RESULTS

Scores on the PRFA ranged from 39 to 160. The scores for upper and lower 27% were as follows: lower 27%, 39-105.5; upper 27%, 131-160. The lower 27% was designated as FI, while the upper 27% was labeled FD.

Of the 27 subjects designated FI, 19 were male and 8 female. In the FD group, 12 were male and 15 female. A chi-square analysis revealed more males were FI than females and more females FD than males ($\chi^2 = 2.73$, $df = 1$, $p < .10$). These results present a sex bias in the expected direction according to previous studies (Dreyer, 1973, 1971).

Table 1 presents a chi-square analysis comparing early and non-early readers with respect to cognitive style. Hypothesis one predicted that significantly more FI children would be early readers than FD children. Early readers were defined as those scoring .1 or greater on the SORT. Only three FI subjects and four FD children scored according to definition. The results of the chi square ($\chi^2 = .66$, $df = 1$) were not significant. Thus, the hypothesis was not supported. There were no significant differences according to cognitive style between early and

non-early readers.

TABLE 1
CHI-SQUARE ANALYSIS OF PRECOCIOUS
READERS AND FI/FD

Group	FI	FD	Total
Early Readers			
Observed	3	4	7
Expected	3.5	3.5	
Non-Early Readers			
Observed	24	23	47
Expected	23.5	23.5	
Total	27	27	54

Note. $\chi^2 = .66$, $df = 1$, $p > .05$. A χ^2 value of 3.84 is needed for significance at the $p < .05$ level.

Hypothesis two predicted that FI children would achieve significantly higher scores on SORT than FD children. Table 2 presents SORT means according to cognitive style. As shown, all t tests of significance between means were not significant indicating that FI children did not achieve significantly higher scores on the SORT than FD children.

A comparison of the means of FI and FD children on the SIT is also presented in Table 2. A t -test analysis revealed that there were no significant differences ($p < .05$) between males, females, or total group with respect

TABLE 2
COMPARISON OF FI AND FD SCORES WITH ORAL READING AND INTELLIGENCE

Test	Sex	Category: FI			Category: FD			<u>t</u>
		<u>n</u>	<u>$\bar{X}$</u>	<u>SD</u>	<u>n</u>	<u>$\bar{X}$</u>	<u>SD</u>	
SORT	Male	19	.011	.04	12	.142	.31	.54
	Female	8	.025	.04	15	.013	.06	.50
	Total	27	.015	.04	27	.070	.21	.50
SIT	Male	19	128.5	15.64	12	125.8	19.83	.42
	Female	8	133.0	14.05	15	134.4	18.00	.19
	Total	27	129.9	15.06	27	130.6	18.96	.15

Note. For a p of .05 the following t values would apply: 2.04, $df = 29$; 2.08, $df = 21$; 2.01, $df = 52$.

to intelligence.

A contingency coefficient between scores on the PRFA and SIT was computed from a chi-square analysis ($\chi^2 = 1.37$, $p > .05$). A low contingency coefficient was found ($C = .16$) indicating FI/FD and intelligence as measured by PRFA and SIT are not related.

Although Witkin (1973) stated that verbal intelligence and measures of FI/FD are not highly related, intelligence tests containing an analytic component do correlate more highly with FI/FD. Correlations of such a magnitude have been reported by Peterson (1969, $r = -.60$, $p < .01$), Watson (1969, $r = .56$, $p < .01$, Grade 3), and Stuart (1967, $r = -.58$, $p < .01$).

The SIT is primarily a measure of verbal intelligence but does contain an analytic component. Consequently a higher correlation between the two variables of FI/FD and intelligence would be expected.

Due to the relatively small number of subjects scoring on the SORT ($n = 7$), correlational analyses were not conducted between SORT/SIT or SORT/PRFA.

CHAPTER V

DISCUSSION

There are a number of reasons why the hypotheses may not have been supported. First, consider the saliency of FI/FD. Dreyer's 1971 study to determine the reliability of the PRFT in measuring the cognitive style of kindergarten children must be considered. Dreyer tested 300 kindergarten children using Oltman's rod and frame model and found a test-retest reliability coefficient of .96 ($p < .01$) over a one month time interval. These results indicate kindergarten FI/FD scores can be reliable. Dreyer also found sex differences in the expected direction with males more FI than females. A similar sex bias was found in the present study using Research Media's PRFA. However, results from a correlational analysis between FI/FD and intelligence do not agree with previous findings which limits the validity of Model PR-20. Nevertheless, it is the opinion of the experimenter that cognitive style was adequately measured in the kindergarten subjects used in this study.

Next, consider the factor of intelligence as related to reading achievement. An analysis of Table 2 reveals that the t tests between the means of FI and FD males, females, and total group were not significantly different.

Notwithstanding, Durkin (1966) found low correlations between intelligence and early reading achievement in her studies of precocious readers ($r = .40$, California, $p < .01$; $r = .24$, New York, $p < .01$). Gluck (1972) also disputed a high relationship between intelligence and success in first grade reading.

The majority of subjects were from a high socioeconomic level which would seem to indicate the presence of a higher number of precocious readers. However, Durkin (1966) found no definite relationship between socioeconomic level and early readers.

In actuality, the results of the present study are not inconsistent with Durkin's California and New York investigations. Durkin found 1% of the population to be precocious readers in the California study and 3.3% in New York (Durkin, 1966). In the present study, 7 subjects out of 54 were found to be early readers which is 13%.

Experimental error was introduced by the use of two community volunteers in administering the PRFA and the SORT. This condition was necessitated by the professional responsibilities of the researcher and the extensive administration time required per subject. The situation may have produced inconsistencies in oral directions and test administration procedures. Despite extensive efforts to eliminate ambient light from the ultraviolet lamp, a degree

of illumination was present. The light may have spatially oriented some subjects thus affecting scores on the PRFA.

The lack of results supportive of the two hypotheses stems from the distribution of early readers across the dimension of FI/FD. The ratio of FI early readers to FD early readers was 3:4. Thus, precocious readers were evenly distributed over this particular cognitive style variable.

Taken at face value, the results seem to indicate cognitive style is not related to early reading ability. However, the sample size employed by Durkin (1966) was considerably larger than the 54 subjects used in this study. The small sample size was dictated by economic and time factors. In the California study, Durkin tested 4,465 subjects and in New York, 5,103. The distinct possibility remains that a larger sample size would have produced a different ratio of FI to FD precocious readers.

In summary, FI/FD was measured accurately in the kindergarten sample, and sex bias was in the expected direction. Intelligence scores between FI and FD groups were also not significantly different, and the percentage of precocious readers was above expectations. However, the lack of significant results was probably due to the distribution of precocious readers over the cognitive style dimension. These findings seem to indicate FI/FD was not

strongly related to early reading ability, a conclusion which may not hold true using a larger sample size.

Suggestions for Further Research

The researcher feels that cognitive style and reading achievement remain an important area in need of investigation. Future studies dealing with precocious kindergarten readers should employ an experimental design allowing for much larger sample sizes as set forth by Durkin (1966). Additional studies may want to employ a more flexible definition of precocious readers such as children who benefit from early teaching and learn at a faster rate.

Significant results may be found when more than one aspect of cognitive style is compared with reading achievement. The dimension of reflection/impulsivity (Kagan, 1965) in conjunction with FI/FD may produce some relationship to reading achievement. Progress in this area has been shown by Keogh (1972) who found the two dimensions of cognitive style to be associated with the educational and behavioral functioning of hyperactive children with learning problems.

Blanton (1973) and Wachtel (1972) suggested FI/FD may be a part of a larger more encompassing cognitive style. A child may be a FI extensive-scanning sharpener or a FD minimal-scanning leveler. It may be beneficial to

administer a battery of cognitive style tests upon entrance to school. This battery may then help in reading success through proper placement and use of proper instructional methods.

The possibility of relating FI/FD to choice of reading instructional materials is mentioned by Peterson (1969). He postulated that teaching method and material format have the capacity to make reading more or less of an embedded task. Peterson presents the hypothesis that pictures and small print may be distracting to FD children.

Witkin (1973) stated that persons of the same cognitive style are more congenial than dissimilar pairs because of similar communication modalities, common personality traits, and shared interests. This statement may have implications for greater school success by utilizing matched groups or similar teacher-pupil groupings.

Bruininks (1969) stated that the relationship between perceptual abilities and reading appears to decrease with age. A dichotomy may exist between the cognitive style of younger and older children with reading difficulties. Older remedial reading students may not be FD as suggested by Witkin (1973). A comparative study of different age children with reading difficulties and FI/FD may be beneficial.

It may also prove beneficial to assess the relationship between FI/FD and early reading ability with respect

to Piagetian stages of development. Early readers may prove to be FI children who have mastered less difficult concrete operational conservation tasks.

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APPENDIX A

DATA FOR FIELD INDEPENDENT SUBJECTS

Subject Number	PRFA	SORT	SIT	Sex
1	39	.2	130.5	M
2	53	0	155.5	M
3	55.5	0	131	M
4	57.5	0	117	M
5	64	0	120.5	M
6	66	0	127	M
7	69	0	95	M
8	72	0	127.5	M
9	72	0	126.5	F
10	73	0	129	F
11	74	0	133.5	M
12	80	0	113	M
13	80.5	0	114.5	M
14	87	0	131	M
15	87.5	0	121	M
16	88.5	0	164	F
17	95.5	0	117	F
18	98.5	0	136	M
19	97.5	.1	129.5	F
20	98.5	0	125	M
21	98.5	0	170	M
22	98.5	0	140	F
23	98.5	0	130	M
24	100.5	0	132.5	M
25	101.5	.1	131.5	F
26	102	0	132	M
27	105.5	0	126.5	F

APPENDIX B

DATA FOR FIELD DEPENDENT SUBJECTS

Subject Number	PRFA	SORT	SIT	Sex
28	131	.1	121	M
29	132	0	101.5	M
30	132	0	125.5	M
31	132.5	0	150	F
32	134	0	127.5	F
33	134.5	0	115	M
34	134.5	0	97	M
35	135	0	113	F
36	136	.8	168.5	M
37	136	0	127.5	M
38	136	0	141	F
39	136	0	122	F
40	140.5	0	125.5	F
41	140.5	0	156.5	F
42	140.5	0	141.5	F
43	141	0	122	F
44	141.5	0	130	M
45	142	.2	160.5	F
46	142.5	0	153	F
47	143	0	133.5	F
48	143	0	126	M
49	145	0	125.5	M
50	149	0	117.5	M
51	151.5	0	105.5	F
52	153.5	.8	155	M
53	160	0	154	F
54	160	0	110.5	F

COURSEWORK

Transfer Credit from Trenton State University

Summer 1973

ELM 563	Staff Development Individualized Instruction	Dr. J. Smith Dr. P. Ollio
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299:561	Foundations of Reading	Dr. E. Fry
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Spring 1974

290:510	Introduction to Educational Tests and Measures	Dr. J. Geyer
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Summer 1974

299:564	Remedial Reading	Dr. M. Kimberley
299:565	Laboratory in Remedial Reading	Dr. M. Kimberley

Fall 1974

290:540	Introduction to Learning	Dr. W. Gillooly Dr. D. Cox
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Spring 1975

299:566	Seminar in Reading Research and Supervision	Dr. M. Kling
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Summer 1975

290:512	Introduction to Child Psychology	Dr. M. Arnold
610:581	Materials for Children	Dr. E. Greene

Fall 1975

299:599	Master's Thesis Research	Dr. E. Fry
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290:525	Psychology of the Exceptional Child	Dr. I. Holowinsky
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